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Consulting for sustainable development, information technologies adoption, marketing and entrepreneurship issues in livestock farms

Zacharoula Andreopoulou[a]*, Georgios Tsekouropoulos[b], Alexandros Theodoridis[c], Vagis Samathrakis[d] and Christos Batzios[c]

[a] *Faculty of Forestry and Natural Environment, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece*
[b] *Dep. of Accounting, Alexander Technological Educational Institute of Thessaloniki, 54700 Thessaloniki, Greece*
[c] *Lab. of Animal Production Economics, Faculty of Veterinary Medicine, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece*
[d] *Dep. of Rural Development & Agribusiness Management, Alexander Technological Educational Institute of Thessaloniki, 54700, Greece*

Abstract

Consulting agricultural services constitute a major key for implementing successfully sustainable development EU goals in rural areas. Today, in the context of the Rural Development Programme 2007-2013, there are initiatives for funding crop and livestock farms and entrepreneurship. Presently, there are bureaus offering consulting services and reliable information to the Greek farmers regarding Information Technologies adoption and innovative e-tools, marketing and processing of agricultural products, certificated agro-products (ISO), modernization of agricultural holdings, etc. Farmers have the opportunity to participate in EU funded measures that support the development of new activities, such as innovative actions, marketing services, new information technologies software and web tools and promote production innovations through specific investments. This paper aims to study and evaluate the adoption of consulting from livestock farms and discuss future opportunities. The study is based on primary data collected from the prefecture of Rodopi, in Thrace/Northeastern Greece, through a farm management survey which was carried out during September and December 2011. A sample of 120 livestock farmers between the ages of 20 and 70 was surveyed for the empirical application of this study using a well-structured questionnaire. The survey took place in private consulting bureaus and locally at farms. The collected data were coded and statistically analyzed using SPSS. Data was classified with cluster analysis in order to identify and describe groups with common attitudes among farmers. Findings show that 54% of the farmers in the sample are interested in consulting and adopt information technology solutions, marketing and entrepreneurship issues, aiming to sustainability in the context of EU goals. The results also indicate that 63% of the farmers have already participated in a program, while 37% have participated in the schemes promoting the establishment of young farmers. Moreover, 55% of them would prefer to be consulted by private consulting bureaus rather than government consulting divisions. Private consulting bureaus satisfy farmers who consider them as a significant support in their attempt to achieve the

* Zacharoula Andreopoulou. Tel.: +30-2310-99-2714
E-mail address: randreop@for.auth.gr

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contemporary EU goals for sustainable development through the adoption of information technologies tools and innovative trade and marketing techniques. Farmers can be further classified in two groups that share similar either innovative or traditional aspects about Greek agriculture trends, in relation to their social characteristics.

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1. Introduction

Sustainable development, as it was initially presented in Broadlands Report (WCED, 1987; IISD, 2012) is defined as the development that meets the needs of the present without depriving the right of future generations to meet their own needs. According to European Commission (EC, 2012) sustainable development ensures the needs of present generations without jeopardizing the ability of futures generations to meet their own needs – that is, better quality of life for everyone, now and for generations to come. It offers a vision of progress that integrates immediate and longer-term objectives, local and global action, and considers social, economic and environmental issues as inseparable and interdependent components of human progress. Sustainable development constitutes the main objective in contemporary research, especially during global economic crisis, aiming to deal with green development challenge.

The European policies focus on the efficient use of resources utilized in agriculture, a sector which remains vital for national economies. Agriculture constitutes the main force for rural economic development, while entrepreneurship and innovation are fundamental for contemporary economies' success. In particular, in the context of the Rural Development Programme 2007-2013, there are initiatives for funding livestock and crop farms and entrepreneurship. The development in agriculture aims at the improvement of economic performance of the sector along with an increase in the quality of farmer's life, while it's important for agricultural entrepreneurship to incorporate innovation. In Greece, farmers have to be aligned to the EU initiatives regarding sustainable development, entrepreneurship, marketing and technological novelties, in order to benefit from European and national funds. In a continuously competitive market environment the production of quality products and the implementation of proper marketing strategies are considered salient features of a contemporary entrepreneur. Therefore, rural entrepreneurships have to adopt innovative management behavior and practices in order to attract and retain customers (Tsekouropoulos et al., 2012).

A major barrier for the production of high-quality and value added products, the adoption of innovative production systems, and the development of integrated food chain and new markets for agricultural products (ADE, 2009) is the lack of information and knowledge in the farming sector, limited research, as well as the lack of data on agronomic and economic aspects of agriculture (Vasilikiotis, 2012). The establishment of the Farm Advisory System in 2003 was an important element of the Common Agricultural Policy (CAP) reform. Council Regulation (EC) 1782/2003, which established common rules for direct support schemes, decoupling farming subsidies from production, introduced the establishment and the use of farm advisory services, in order to help farmers to assess their performance of their agricultural holding and identify necessary improvements. The setting up of farm management, farm relief and farm advisory services for farmers should help them to adapt, improve and facilitate management and improve the overall performance of their holdings by further enhancing the human potential operating in the agricultural sector (EC, 2005).

Within this context, Farm Advisory Services constitute a major key for implementing successfully sustainable development EU goals in rural areas. Presently, there are bureaus offering advisory services and reliable information to Greek farmers about Information Technologies adoption and innovative e-tools, marketing and processing of agricultural products, certificated agro-products (ISO), modernization of agricultural holdings, restructuring of livestock sector, etc. Farmers have the opportunity to participate in EU funded measures that support the development of new activities, such as innovative actions, marketing services, new Information Technologies software and web tools and promote production innovations through specific investments. The private consultants visit the agricultural holding, record the existing situation, conduct a market research and viability study, assess the

funding opportunities, study, schedule and develop a business plan, review technical environmental impact reports and total management systems for quality control, define the prerequisites for a multiple coherence that can be applied in the farm and finally support the farmers to adjust to the policy demands with their theoretical and practical background. In general, the Farm Advisory System consists of three elements: (i) Information as the provision of facts, (ii) Advice as the provision of technical skilled opinion on specific subjects to facilitate farmers in their decisions regarding production and marketing process, and (iii) Training as the acquisition of competences to improve farms' performance (ADE, 2009).

Moreover, Information and Communication Technologies (ICTs) have also gained a continuously growing focus in all stages of EU initiatives and projects funding, from initial information to final accomplishment level and they can adjust the socio-economic environment of rural areas. Innovative ICTs such as broadband infrastructures, mobile internet and smart devices have become the means to advance the public sector's performance in terms of information and service delivery, to encourage citizen participation and to improve agricultural and environmental governance issues (Andreopoulou et. al., 2011). Investments in ICTs are a key factor in driving innovation in companies, driving productivity growth and competitiveness and creating jobs (EU, 2012). Internet applications, innovative software applications and tools, successful practices using efficiently ICTs in entrepreneurship, such as e-marketing, product promotion and competitiveness are encouraged within EU initiatives while implementing effective projects and initiatives in rural areas (Tsekouropoulos et. al, 2012a) .

This paper aims to study and evaluate the adoption of consulting from livestock farms in Greece and discuss future opportunities and prospects. The case of livestock farmers in the area of Rodopi, in Thrace/N.E. Greece is studied, aiming to identify the extent at which Greek farm entrepreneurships are ready to accept information technology tools and services, business innovation and funding via European programs, to use internet applications for product marketing and promotion. Moreover, the readiness of the farmers to collaborate with private consulting experts is also examined.

2. Methodology

This study is based on primary data collected from the Prefecture of Rodopi, in the Region of North-eastern/Thrace in Greece. The study was conducted through a farm management survey, which was carried out during September and December 2011. A sample of 120 livestock farmers between the ages of 20 and 70 was surveyed for the empirical application of this study using a well-structured questionnaire.

Livestock farmers in Rodopi were interviewed, in order to investigate their willingness to receive private consulting for the efficient management of their farms, through the utilization of modern entrepreneurship opportunities, EU funding instruments and measures, the introduction of technology and the use of the internet for products marketing and promotion and their willingness to collaborate with private consulting experts. The survey took place in private consulting bureaus and locally at farms. The collected data were coded and statistically analyzed using SPSS.

Further, observations were classified with multi-variant analysis method of cluster analysis in order to identify and describe groups with common attitudes among farmers. Farmers were classified into clusters. The resulting clusters of farmers should then exhibit high internal homogeneity (within cluster) and high external (between clusters) heterogeneity (Hair et al., 1998). Data was first classified with hierarchical cluster analysis in order to identify the number of common groups for every given set of variables. Hierarchical procedure involves the construction of a hierarchy of a tree like structure that helps to indicate the number of clusters within the cases. In order to determine the final number of the clusters (stopping rule) large increases in the average within-cluster distance are identified. The prior cluster solution is then selected on the logic that its combination caused a substantial decrease in similarity (Hair et al., 1998). K-means (quick) cluster analysis is then conducted in order to identify the cases of the farmers that are finally included in each cluster and create groups with common features among farmers. The group profiles can be easily determined and described from the final cluster centers.

3. Results

Prefecture of Rodopi is situated at the heart of Eastern Macedonia/Thrace Region, Greece, has a population of 116000 and an area of 80,000 hectares cultivated by 15,000 small and medium sized farms. Livestock sector in Rodopi includes dairy and sheep-goat farms, as well as apicultures, and its main products are cow milk, sheep/goat milk and meat, honey, cheese and butter. Regarding the structural and demographic data in the area of Rodopi, 62% of the agricultural holdings have a farm size between 0.5-5 hectares, confirming the common finding that small farm size constitutes one of the most important structural drawbacks of Greek farming, while the majority of the farmers in the survey are men (68%). Results indicate that for the total responders, 43% of the farmers are involved in farming due to their expertise, 26% of them denote the natural succession in the family environment, 25% because they love nature and environment, and 13% because they love their home-town. Moreover, 22% are dealing with livestock sector because they already had a farm in the family, while only 3% is involved in farming because they consider it as a profitable job. The 57% of the farmers in the survey achieve an income among 11000-20000 €. Their expertise in agricultural and livestock issues derives mainly from practice (62%) and only 36% have participated in seminars organized for new farmers.

Only 22% of the interviewed livestock farmers use an accountant for keeping financial records and accounts regarding farm income and expenses. Results show that 42% of the farmers in the survey believe that they are very well informed on issues related to funding from national and European programs. The results also indicate that 63% of the farmers have already participated in a funding program while 37% have participated in the schemes promoting the establishment of young farmers and 25% have participated in less favoured areas compensated allowances. Among farmers that have already financed by the EU agricultural fund, 44.7% of them received a 9-grade compulsory education and 34.2% of them received Higher Education.

Regarding the age of the farmers, who have already participated in a rural development measure, 28% of them are of 20-30 years old, 28% of 31-40, 18% of 41-50, 23% of 51-60 and 3% over 60 years old.

The main source of information on management issues stems from various sources (Table 1), such as private bureau of consultants with experts in geosciences for agricultural issues (93%), colleague local farmer (83,3%), farmer's family environment (55%), radio and TV programs (33.3%), local co-operative (25%), members of local authorities (25%) civil servants in a relative local government unit (22%), newspapers-magazines (10%), friends (8,3%), farmer's accountant (5%) and from a local agronomist or agriculturist who owns a supply-shop (5%).

Table 1. Sources of information for farmers and total rating

Sources of information for farmers	Rate	%
Private consultant firm with experts in geotechnical issues	1	93.0
Colleague local farmer	2	83.3
Local government specific unit	3	71.6
Family environment	4	55.0
Radio-TV	5	33.3
Co-operative	6	25.0
Member of the local politics	6	25.0
Civil servant in local government unit	7	22.0
Friends	8	8.3
Agronomist in local agricultural store	9	5.0
Accountant	9	5.0
Newspaper-magazine	10	1.0

According to familiarity of the farmers to the various professionals and services, that act as information sources and provide consulting on agricultural entrepreneurship and marketing opportunities, the respondents rated their sources, as it is presented in the following Table 2. Evidently, the respondents are totally aware of the services

provided by private consultants, local agronomists, local citizens' centers and e-centers, co-operatives, agricultural municipality units, the Agricultural Bank of Greece, local government units related to agricultural entrepreneurship etc. However, they are less familiar with carriers providing consulting such as Regional Government Divisions related to agricultural entrepreneurship, Local Development Agencies, Universities & Technological Institutes and finally European Organizations' websites. Although, farmers are aware of the consulting services that can be provided by the above carriers, they do not equally acknowledge them. Moreover, Table 2 presents the farmers' evaluation of the consulting services provided by the aforementioned carriers, professionals and services, however, the evaluation of provided services as "excellent", "very good", "average" or "inadequate" was able only by farmers who were familiar to a carrier as provider of consulting services.

Table 2. Familiarity and evaluation of the provided consulting services

Carriers providing consulting services to farmers	Familiarity to provided consulting services (%)	Evaluated as "excellent" provided consulting services	Evaluated as "very good" provided consulting services	Evaluated as "average" provided consulting services	Evaluated as "inadequate" provided consulting services
Private consultant bureaus, expert in geotechnical issues	100	48.3%	46.6%	3%	2.1%
Citizen's service centers /local e-centers	100	41.6%	45%	13.4%	0%
Local agronomist at agricultural supplies shop	100	15%	23.4%	61.6%	0%
Co-operatives	100	1.6%	18.3%	75%	5.1%
Local government units related to agricultural entrepreneurship, e.g. Agriculture Bureau, Commerce Bureau, Environment Bureau	100	1.6%	25%	70%	3.4%
Municipality divisions related to agricultural entrepreneurship	100	0%	16.6%	78.3%	5.1%
Agricultural Bank of Greece	100	1.6%	25%	71.6%	1.8%
Regional Government Divisions related to agricultural entrepreneurship	36.6	0%	21.6%	15%	0%
Local Development Agency	15	0%	5%	5%	5%
Universities-Technological Institutes	10	0%	6.5%	3.3%	0.2%
European organizations websites	8	0%	6.5%	1.5%	0%

*The evaluation was accomplished only by farmers who were familiar to a carrier, as provider of consulting services.

Private bureaus for agricultural consulting have achieved a higher evaluation than other consulting carriers. The 48.3% of farmers in the survey evaluated the consulting services provided as "excellent", 46.6% as "very good", 3% have evaluated services as "average" and only 2.1% as "inadequate" . Farmers in the survey are totally aware of the advantages that occur from the use of the network and Internet services, as it is also indicated from the evaluation of

local e-centers. Results show that 41.6% of them evaluated provided services as "excellent" and 45% evaluated services as "very good". On the contrary, carriers such as local co-operatives, municipality divisions, Agricultural Bank of Greece and Local Government Units related to agricultural entrepreneurship, e.g. Agriculture Bureau, Commerce Bureau, Environment Bureau, have achieved an "average" evaluation of their consulting services between 70-75%, although farmers are 100% familiar to the services provided by them. It's worth mentioning that Local Development Agencies, Universities, Technological Institutes and Organization websites achieve low evaluation for their services, however, farmers are not familiar to the services they can provide.

The results of the empirical descriptive analysis show that 80% of the farmers interviewed in the survey are interested in consulting and adopting information technology solutions, marketing and entrepreneurship issues, aiming to sustainability in the context of EU goals, and even willing to pay an amount of money for those services. This finding which implies that farmers are fully aware of the importance of consulting in the improvement of the economic performance as well as in the efficient operation of their farm. Besides, 55% of livestock farmers would prefer to be consulted by private consulting bureaus rather than Government Consulting Divisions, underlying their disbelief in governmental services. The frequency that farmers visit private consulting experts in respect to their education level and their satisfaction from the provided services is summarized in Table 3. The 49.7% of the farmers visit private consulting Bureaus for Agricultural Consulting once a month and they are "much" (26.5%) or "very much" satisfied (23.2%), respectively, while the 40% of interviewed farmers visit once every 6 months; 28.2% are "much" satisfied and only 9.9% "very much" satisfied (Table 3).

Table 3. Frequency of farmers' visits to private consultants in respect to their educational level and their satisfaction.

How often do you visit a private Consultant Bureaus for Agricultural Consulting?			Rate your satisfaction from the information and the provided services from private Bureaus for Agricultural Consulting and Studies (%)			
			Little	Much	Very much	Total
Once a week	Educational level	High School	0.0	0.0	2.0	2.0
		Total	0.0	0.0	2.0	2.0
Once a month	Educational level	Elementary	0.0	6.6	6.6	13.2
		9 -Grade	0.0	11.6	10.0	21.6
		High School	0.0	8.3	6.6	14.9
		Total	0.0	26.5	23.2	49.7
Once every 6 months	Educational level	Elementary	0.0	16.6	5.0	21.6
		9-Grade	0.0	10.0	1.6	11.6
		High School	1.9	1.6	3.3	6.8
		Total	1.9	28.2	9.9	40.0
Once a year	Educational level	High School	0.0	3.3	5.0	8.3
		Total	0.0	3.3	5.0	8.3
Total	Educational level	Elementary	0.0	23.2	11.6	34.8
		9-Grade	0.0	21.6	11.6	33.2
		High School	1.9	13.2	16.9	32.0
		Total	1.9	58.0	40.1	100.0

3.1. Classification of farmers

Cluster analysis resulted in the classification of farmers into two clusters, which constitute two different profiles; Group-1 of "new farmers" and Group-2 of "old farmers".

The hierarchical cluster analysis that was conducted showed that there are two main groups of farmers that share common features. K-means cluster analysis shows that Group 1 includes 58 farmers, that is 48.3% of the sample farms, while Group 2 includes 62 farmers (51.7% of the sample). The two groups that are formulated exhibit high internal homogeneity (within cluster) and high external (between clusters) heterogeneity, while group profiles can be easily determined from the description of the final cluster centers.

The average profile of the farmers classified in group-1 is: farmers in the average age of 34, whose agricultural training does not derive from practice but from organized seminars, and who believe that family environment is not the carrier to provide the basic Information on agricultural holding management issues. Moreover, farmers of this cluster are aware of the specified services provided by Educational and Research Institutes relative to their profession and they believe that Internet and media constitute the most convenient way to get properly informed.

The average profile of the farmers classified in group-2 is: farmers in the average age of 55, whose agricultural training derives from practice and not from organized seminars and who believe that family environment is the carrier to provide the basic information on agricultural holding management issues. Furthermore, farmers of this cluster are not aware of the specified services provided by Educational and Research Institutes relative to their profession and they do not believe that internet and media constitute the most convenient way to get properly informed.

4. Conclusions

It's important for the agricultural entrepreneurship to incorporate innovation. Internet applications should be encouraged as a major tool while implementing funding projects, marketing promotion and consulting in rural areas. Aiming to success, it is compulsory to have green growth, novelty and innovation in the agricultural entrepreneurship sector.

The leading trend has been the creation of private bureaus offering consulting services to the Greek farmers and breeders, since that 48.3% of the respondents in the survey evaluate their provided services as excellent, while they are willing to pay for their services. Yet, the respondents usually prefer local communication channels, aiming to collect the proper and reliable information for their participation in a funding program for agricultural entrepreneurship such as government and municipal units, co-operatives, Agricultural Bank, local agronomists who own local agricultural supplies shops, local colleague farmers based on their expertise, but they evaluate their services as "average"

Green growth, novelty and innovation are considered fundamental elements for a successful development of the agricultural entrepreneurship sector. Private consulting bureaus satisfy farmers who consider them as a significant support in their attempt to achieve the contemporary EU goals for sustainable development through the adoption of information technologies tools and innovative trade and marketing techniques. Farmers can be further classified in two groups that share similar either innovative or traditional aspects, about Greek agriculture trends. "New" farmers, which represent almost half of the sample, are well informed and they can take advantage of future perspectives in agricultural innovation as we can easily identify a higher level of information in contemporary perspectives and potential. However, results regarding Group-2, of "old" farmers, indicate that, although Greek agri-business sector is ready to accept funding via European programs and make use of private consulting from agricultural experts, they have to broaden their perspective from local and family aspect, to encompass new technologies, Internet and media and to trust expert services provided by educational and research institutes. Findings of the research can be used to support the organization of local seminars in rural areas as a tool to confront digital divide in older farmers and to familiarize them with innovative agricultural trends.

References

ADE, 2009. *Evaluation of the Implementation of the Farm Advisory System*, Final Report – Evaluation Part, December 2009.

Andreopoulou, Z., Manos, B., Viaggi, D. and Polman, N. (Editors), 2011. *Agricultural and Environmental Informatics, Governance, and Management: Emerging Research Applications*. IGI Global. USA

EC, 2012. *Sustainable Development*, http://ec.europa.eu/environment/eussd/

EC, 2005. *Council Regulation No 1698/2005 of 20 September 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD),* L 277, pp 1-40.

EU, 2012. *From ICTs to innovation*. http://ec.europa.eu/information_society/l/research/

IISD, 2012. *What is Sustainable Development? Environmental, Economic and Social Well-being for Today and Tomorrow*. International Institute for Sustainable Development, http://www.iisd.org/sd/

Hair, J.F.Jr., Anderson R.E., Tatham R.L., Black W.C., 1998. *Multivariate Data Analysis*. 5th edition. Prentice-Hall, Inc.USA.pp.5-6.

Tsekouropoulos, G., Andreopoulou, Z., Seretakis, A., Koutroumanidis, T. & Manos, B., 2012. Optimizing E-marketing Criteria for Customer Communication in Food and Drink Sector in Greece. *International Journal of Business* Information Systems, Vol. 9, No. 1, pp.1-25.

Tsekouropoulos G., Andreopoulou Z., Koliouska Ch., Koutroumanidis Th., Batzios Ch., Lefakis P., 2012a. Marketing Policies through the Internet: The Case of Skiing Centers in Greece. *Scientific Bulletin - Economic Sciences*, 2012, vol. 11, issue 1, pp 66-78.

Vasilikiotis C., 2012. Alternative sustainable farming systems: the importance of education, training and extension to comply with changing regulatory landscape and consumer demands in Greece. Proceedings of the EMRA International Conference on Animation of rural development – a new profession?, Chania, Greece**,** pp. 56-63.

WCED, 1987. *Our Common Future, World Commission on Environment and Development*, Oxford: Oxford University Press, pp. 43.